THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

GREEN MOUNTAIN GLASS, LLC and CULCHROME, LLC, Plaintiffs/Counter-Defendants, v. O-I GLASS, INC. and OWENS-BROCKWAY GLASS CONTAINER INC., Defendants/Counterclaimants.	§ § § § § § § § § § §	Civil Action No. 6:19-CV-600-ADA JURY TRIAL DEMANDED

DECLARATION OF DR. RICHARD K. BROW IN SUPPORT OF O-I GLASS, INC. AND OWENS-BROCKWAY GLASS CONTAINER INC.'S REPLY CLAIM CONSTRUCTION BRIEF

1. My opinions in this Declaration are based on my personal knowledge, experience, and professional judgment—as well as the materials identified in my Declaration dated July 30, 2020 (which I will refer to as my "First Declaration") and the following additional materials:

- Plaintiffs' Opening Claim Construction Brief, dated July 30, 2020;
- Plaintiffs' Response to Defendants' Opening Claim Construction Brief, dated August 27, 2020;
- Apotheker, S., Glass containers: how recyclable will they be in the 1990s?, *Resource Recycling*, June 1991 at 25-32.

2. I have prepared this Declaration in response to Plaintiff Green Mountain Glass, LLC and Culchrome, LLC's (collectively, "Green Mountain") Response to Defendants' Opening Claim Construction Brief.

3. Unless otherwise stated, my opinions in this Declaration are from the perspective of a person of ordinary skill in the art as of March 3, 1995 for the '737 patent and as of April 9, 1998 for the '521 patent. This is true even if the testimony is stated in the present tense. That said, my opinions about how a person of ordinary skill in the art would construe the disputed claim terms would be the same if considered anytime during the years 1995 through 1998.

4. I have followed the legal principles provided in my First Declaration in reaching and providing the below opinions about how a person of ordinary skill in the art at the relevant time would understand the meaning of certain claim terms in the '737 and '521 patents.

5. A person of ordinary skill in the art would have understood that the patent claim term "mixed color glass cullet" means "broken pieces of glass of mixed colors and types that are not primarily or largely one color."

6. Green Mountain's Response Brief, such as at pages 16–18, claims that the patent specifications and cullet specifications are inconsistent with this meaning and with each other. I disagree. A person of ordinary skill in the art would have readily understood, and the cullet

specifications demonstrate, that whether cullet is "primarily or largely one color," as opposed to being mixed color cullet, depends on the circumstances. Sorted flint cullet tolerates fewer off-color impurities than sorted amber cullet, which tolerates fewer off-color impurities than sorted green cullet. Other factors can also play a role, such as manufacturer-specific tolerances based on a particular producer's own equipment, processes, and target color specifications. For instance, as discussed in my First Declaration, both O-I and ASTM prepared specifications for sorted single color cullet. Brow Decl. at ¶¶ 30-34. While the specifications are not identical, they both confirm my opinion that sorted single color cullet would have had measurable off-color impurities despite being primarily or largely one color.

7. Academic and commercial publications uniformly recognize that such variances existed and discuss the levels of off-color impurities in sorted flint, amber, and green cullet. This fact would have been well known to a person of ordinary skill in the art in 1995–1998 and supports my opinion in this affidavit.

8. This explains why a cullet composition of 65% flint, 20% amber, and 15% green, referenced in Green Mountain's Response at page 16, is not considered primarily or largely one color (flint). By contrast and for example, percentages as high as 98% one color are considered primarily or largely one color regardless of whether this percentage corresponds to sorted flint, amber, or green cullet. Indeed in practice, all sorted single color cullet have some level of off-color impurities and no sorted single color cullet is 100% one color.

9. One of the key factors for how much off-color cullet can be tolerated in a sorted single color stream is the target color of that stream. As discussed in my prior First Declaration, different colorants in the glass pieces have different levels of potency. For instance, green glass is often colored with chromium, a colorizing agent with a relatively large extinction coefficient,

while flint glass has relatively low amounts of colorant present. Thus, sorted green cullet can tolerate a higher level of off-color impurities than sorted flint cullet. These variances were well-documented in the academic and commercial literature before and as of 1995.

10. For instance, a paper published in 1974 from the 78th National Meeting of the American Institute of Chemical Engineers ("Arrandale") provides specifications from the Glass Container Manufacturers' Institute. AG Ex. K at 15. Those specifications identified tolerable amounts of off-color impurities for the major cullet colors. According to this paper, cullet must be at least 95% flint compared to other colors to qualify as flint cullet under the specifications. The paper contains other requirements for amber (90%) and green (50%). The paper explained reasons for these variances. Flint was the most restrictive "since any chrome or iron coloration is undesirable in the finished glass." *Id.* Amber is more tolerant, but "the green tint of chromium oxide begins to be visible in finished glass at a level of about 10% in the purchased cullet." *Id.*

11. That same year, the Institute for Environmental Studies at the University of Wisconsin-Madison published a study on Glass Recycling and Reuse, which included the same cullet color specifications as Arrandale above. AG Reply Ex. T at 34-35. That paper similarly explained that "[f]lint glass production is the most restrictive …, as more than 5 percent amber or green glass in the cullet produces a product with noticeable color," but that "[a]s much as 50 percent of the cullet can be amber or flint for the production of green glass." *Id.* at 36.

12. Government reports similarly acknowledge these variances between the different colors. The EPA provided a similar set of specifications for the maximum levels of impurities in green, amber, and flint cullet and again explained that the rationale for the chosen levels was to "provide[] the industrial user with reasonable assurance that his final product will not be offcolor, [sic] and, therefore, will meet specification requirements." AG Reply Ex. U at 75.

13. Because of these differences, a person of skill in the art would not consider the line between mixed color cullet and sorted single color cullet to be a "one-size-fits-all" percentage of tolerable impurities. Rather, sorted single color cullet is primarily or largely one color, with the precise proportions depending on other factors, primarily the color of glass.

14. As noted above, the EPA distinguished sorted single color cullet with off-color impurities from mixed color cullet. The patents themselves draw a similar distinction, which is confirmed by the prior art. The patents explain that "To date, mixed colored cullet has had only limited commercial use, and may be used as an aggregate in paving material, land-fill cover, or some similar use, but often is discarded in landfills. The mixed colored material is substantially less valuable than color sorted cullet." '737 patent at 2:5-9.

15. I reviewed Green Mountain's Response and note that it includes the following statement on page 15 regarding mixed color cullet: "A primary advantage of the patents-in-suit is that they made this otherwise unusable material usable." This statement confirms my opinion that there is a distinction between mixed color cullet and sorted single color cullet with off-color impurities. Sorted single color cullet with off-color impurities was routinely used in glass container manufacture before 1995. The above specifications for purchasing sorted single color cullet for container manufacturing demonstrate this fact. Conversely, as the '737 and '521 patents explain, mixed color cullet was a different material used instead as aggregate in paving material, landfill cover, or often discarded in landfills.

16. This distinction is further confirmed by my review of the prior art. One article even explained that "[w]ith the flood of color-sorted cullet available, many container manufacturers that had taken two- and three-color mixed cullet have shut their doors to it or vastly reduced the price they will pay for it." AG Reply Ex. V at 25. It goes on to explain that

"[p]iles of color-mixed cullet are building up at materials recovery facilities and other processing operations or going to landfills." *Id.*

17. In preparing this Declaration, I have reviewed materials and made inquiries that I believe are appropriate considering the evidence available at this time. I understand that I will have the right to supplement or amend this Declaration in the event that additional evidence or information relevant to my opinions becomes available. I may also provide rebuttal to any opinions of other fact and expert witnesses, or in response to any submissions from Green Mountain, should I be asked to do so.

* * *

I declare under penalty of perjury that to the best of my knowledge, information, and belief, the foregoing is true and correct

Executed on September 16, 2020 in Rolla, Missouri.

Richard K. Brow

Dr. Richard K. Brow

CERTIFICATE OF SERVICE

I hereby certify that on September 17, 2020, a true and correct copy of the foregoing document was served on all counsel of record via the Court's CM/ECF Electronic Filing System.

/s/ Brian C. Nash
Brian C. Nash